

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
Yoo, et al.

Serial No.: 10/023,125

Confirmation No.: Unknown

Filed: December 17, 2001

For: Pulse Nucleation Enhanced
Nucleation Technique for
Improved Step Coverage
and Better Gap Fill for
WCVD Process

Assistant Commissioner for Patents
Washington, D.C. 20231

Dear Sir:



Group Art Unit: Unknown

Examiner: Unknown

CERTIFICATE OF MAILING 37 CFR 1.8	
I hereby certify that this correspondence is being deposited on May <u>2</u> , 2002 with the United States Postal Service as First Class Mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231.	
<u>5/2/02</u>	<u>Kent</u>
Date	Signature

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

The Applicants, and the Attorney who signs below on the basis of the information supplied by the inventor and the information in his file, submit herewith patents, publications, or other information of which they are aware, which may be material to the examination of this application and in respect of which there may be a duty to disclose in accordance with 37 CFR § 1.56.

While the information submitted in this Supplemental Information Disclosure Statement may be material pursuant to 37 CFR § 1.56, it is not intended to constitute an admission that any patent, publication, or other information referred to therein is prior art for this invention unless specifically designated as such.

In accordance with 37 CFR § 1.97, this Supplemental Information Disclosure Statement is not to be construed as a representation that a search has been made or that no other possibly material information as defined under 37 CFR § 1.56(a) exists.

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The patents and/or publications submitted herewith are set forth on the attached Form PTO-1449.

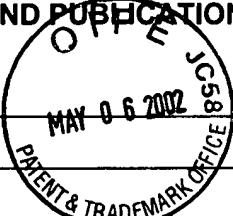
If the sum of \$180.00 is due under 37 CFR § 1.17(p) pursuant to § 1.97, the Commissioner is hereby authorized to charge this fee, and any other fee necessary to make this submission timely, to the Deposit Account No. 20-0782/APPM/5730/BTP.

Respectfully submitted,



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U.S. Department of Commerce, Patent and Trademark Office (PTO Form 1449 modified)		Docket No. APPM/5730	Serial No. 10/023,125
SUPPLEMENTAL LIST OF PATENTS AND PUBLICATIONS CITED BY APPLICANT		Applicant Yoo, et al.	Confirmation No.: Unknown
(Use several sheets if necessary)		Filing Date	Group
	Examiner Unknown	December 17, 2001	Unknown

**U.S. Patent Documents**

*Examiner Initial	Document Number	Issue Date	Applicant(s) Name	Class	Subclass	Filing Date If Appropriate
A1	4,813,846	03/21/89	Helms	414	744.1	04/29/87
A2	4,917,556	04/17/90	Stark et al.	414	217	05/26/89
A3	4,951,601	08/28/90	Maydan, et al.	118	719	06/23/89
A4	5,000,113	03/19/91	Wang et al.	118	723	12/19/86
A5	5,028,565	07/02/1991	Chang, et al.	437	192	08/25/1989
A6	5,173,474	12/22/1992	Connell, et al.	505	1	03/11/1991
A7	5,186,718	02/16/93	Tepman et al.	29	25.01	04/15/91
A8	5,205,077	04/27/93	Wittstock	51	165 R	08/28/91
A9	5,234,561	08/10/93	Randhawa et al.	204	192.38	08/25/88
A10	5,259,881	11/09/93	Edwards, et al.	118	719	05/17/91
A11	5,286,296	02/15/94	Sato et al.	118	719	01/09/92
A12	5,580,380	12/03/1996	Liu, et al.	117	86	01/30/1995
A13	5,609,689	03/11/97	Kato et al.	118	719	06/03/96
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A15	5,674,786	10/07/97	Turner et al.	437	225	06/05/95
A16	5,695,564	12/09/97	Imahashi	118	719	08/03/95
A17	5,730,801	03/24/98	Tepman et al.	118	719	08/23/94
A18	5,788,447	08/04/98	Yonemitsu et al.	414	217	08/05/96
A19	5,788,799	08/04/98	Steger, et al.	156	345	06/11/96
A20	5,801,634	09/01/98	Young et al.	340	635	09/08/97
A21	5,856,219	01/05/99	Naito et al.	438	241	08/18/97
A22	5,866,213	02/02/99	Foster et al.	427	573	07/19/97
A23	5,866,795	02/02/99	Wang et al.	73	1.36	03/17/97
A24	5,882,165	03/16/99	Maydan et al.	414	217	09/10/97
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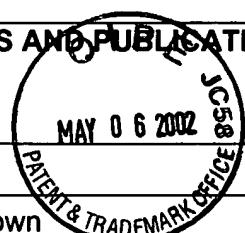
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Foreign Patent Documents

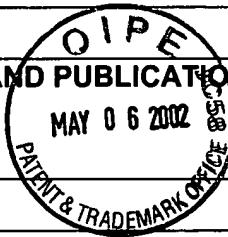
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U.S. Department of Commerce, Patent and Trademark Office		Docket No.	Serial No.
(PTO Form 1449 modified)			
SUPPLEMENTAL LIST OF PATENTS AND PUBLICATIONS CITED BY APPLICANT		Applicant	Confirmation No.:
		Yoo, et al.	Unknown
(Use several sheets if necessary)		Filing Date	Group
	Examiner Unknown	December 17, 2001	Unknown


Foreign Patent Documents

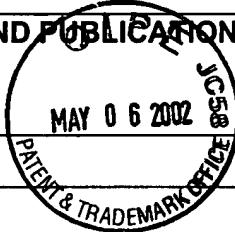
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	Examiner Unknown		


Foreign Patent Documents

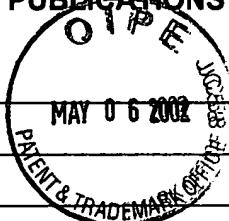
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**Foreign Patent Documents**

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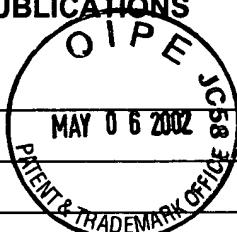
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	Examiner	Unknown						
Foreign Patent Documents								
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B113		06-177381	06/24/1994	JP	H01L	29/784	<input checked="" type="checkbox"/>	<input type="checkbox"/>
B114		06-196809	07/15/1994	JP	H01S	3/18	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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B120		07-086269	03/13/1995	JP	H01L	21/314	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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SUPPLEMENTAL LIST OF PATENTS AND PUBLICATIONS CITED BY APPLICANT				Applicant Yoo, et al.	Confirmation No.: Unknown
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	Examiner Unknown				

**Foreign Patent Documents**

*Examiner Initial		Document Number	Date	Country	Class	Subclass	Translation	
							YES	NO
	B121	07-086269	03/13/1995	JP	H01L	21/314	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	B122	08-181076	07/12/1996	JP	H01L	21/205	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	B123	08-245291	09/24/1996	JP	C30B	25/14	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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	B141	2001-152339	06/05/2001	JP	C23C	16/40	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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	B143	2001-189312	07/10/2001	JP	H01L	21/316	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	B144	2001-217206	08/10/2001	JP	H01L	21/285	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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	B146	2001-220294	08/14/2001	JP	C30B	29/20	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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	Examiner Unknown		

**OTHER ART**

*Examiner Initial		Including Author, Title, Date, Pertinent Pages, Etc.
	C1	Ohba, et al., "Thermal Decomposition of Methylhydrazine and Deposition Properties of CVD TiN Thin Films", Conference Proceedings, Advanced Metallization for ULSI Applications in 1993 (1994), pp. 143-149
	C2	Scheper, et al., "Low-temperature deposition of titanium nitride films from dialkylhydrazine-based precursors", Materials Science in Semiconductor Processing 2 (1999), pp. 149-157
	C3	Suzuki, et al., "A 0.2- μ m contact filing by 450°C-hydrazine-reduced TiN film with low resistivity", IEDM 92-979, pp. 11.8.1 – 11.8.3
	C4	Suzuki, et al., "LPCVD-TiN Using Hydrazine and TiCl ₄ ", VMIC Conference (June 8-9, 1993), pp. 418-423
	C5	IBM Tech. Disc. Bull. "Knowledge-Based Dynamic Scheduler in Distributed Computer Control, (June 1990), pp. 80-84
	C6	IBM Tech. Disc. Bull. "Multiprocessor and Multitasking Architecture for Tool Control of the Advanced via Inspection Tools" (May 1992), pp. 190-191
	C7	McGeachin, S., "Synthesis and properties of some β -diketimines derived from acetylacetone, and their metal complexes", Canadian J. of Chemistry, Vol. 46 (1968), pp.1903-1912
	C8	Solanki, et al., "Atomic Layer deposition of Copper Seed Layers", Electrochemical and Solid State Letters, 3(10) (2000), pp. 479-480
	C9	NERAC.COM Retro Search: Atomic Layer Deposition of Copper, dated October 11, 2001
	C10	NERAC.COM Retro Search: Atomic Layer Deposition / Epitaxy Aluminum Oxide Plasma, dated October 2, 2001
	C11	NERAC Search abstract of "Atomic Layer deposition of Ta and Ti for Interconnect Diffusion Barriers", by Rossnagel, et al., J. Vac. Sci. & Tech., 18(4) (July 2000)
	C12	Abstracts of articles re atomic layer deposition
	C13	Abstracts of search results re atomic layer deposition, search dated January 24, 2002
	C14	Abstracts of articles re atomic layer deposition and atomic layer nucleation
	C15	Abstracts of articles re atomic layer deposition and semiconductors and copper

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**OTHER ART**

*Examiner Initial		Including Author, Title, Date, Pertinent Pages, Etc.
	C16	Abstracts of articles – atomic layer deposition
	C17	NERAC Search – Atomic Layer Deposition, search dated October 16, 2001
	C18	Bader, et al., "Integrated Processing Equipment", Solid State Technology, Cowan Pub., Vol. 33, No. 5 (May 1, 1990), pp. 149-154
	C19	Choi, et al., "The effect of annealing on resistivity of low pressure chemical vapor deposited titanium diboride", J. Appl. Phys. 69(11) (June 1, 1991), pp. 7853-7861
	C20	Choi, et al., "Stability of TiB ₂ as a Diffusion Barrier on Silicon", J. Electrochem. Soc. 138(10) (October 1991), pp. 3062-3067
	C21	"Cluster Tools for Fabrication of Advanced devices" Jap. J. of Applied Physics, Extended Abstracts, 22 nd Conference Solid State Devices and Materials (1990), pp. 849 – 852
	C22	"Applications of Integrated processing", Solid State Technology, US, Cowan Pub., Vol 37, No. 12 (December 1, 1994), pp. 45-47
	C23	Kitigawa, et al., "Hydrogen-mediated low temperature epitaxy of Si in plasma-enhanced chemical vapor deposition", Applied Surface Science (2000), pp. 30-34
	C24	Lee, et al., "Pulsed nucleation for ultra-high aspect ratio tungsten plugfill", Novellus Systems, Inc. (2001), pp. 1-2 (COPY NOT AVAILABLE TO APPLICANT AT THIS TIME)

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